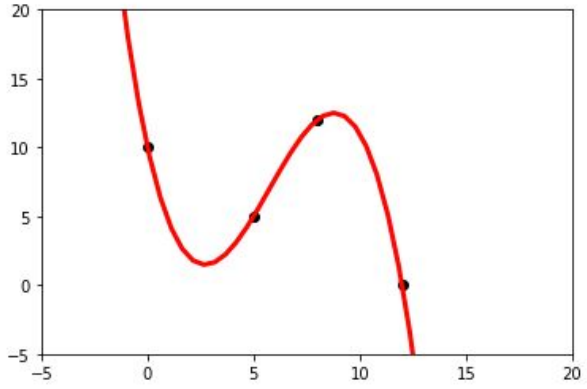
Note: My biggest struggle was with using the scikit learn software, any suggestions to help in the comments would be appreciated!

Question 1

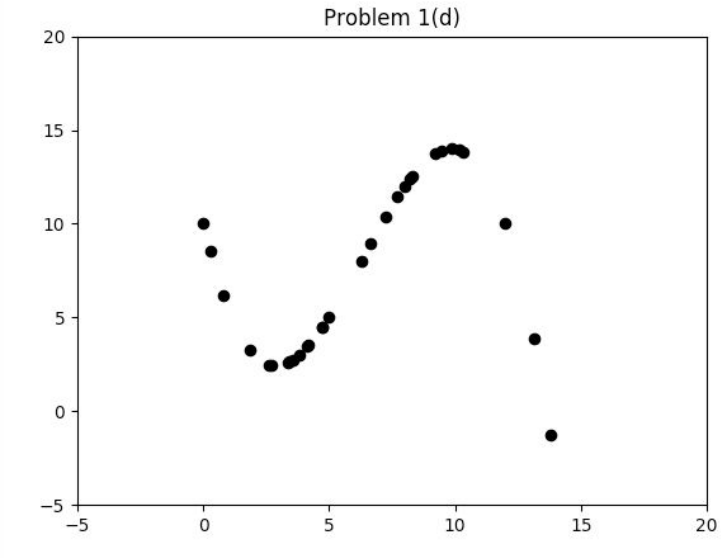
a. polynomial: [[1,0,0,0], [1,5,25,125], [1,8,64,512], [1,12,144,1728]]

b.

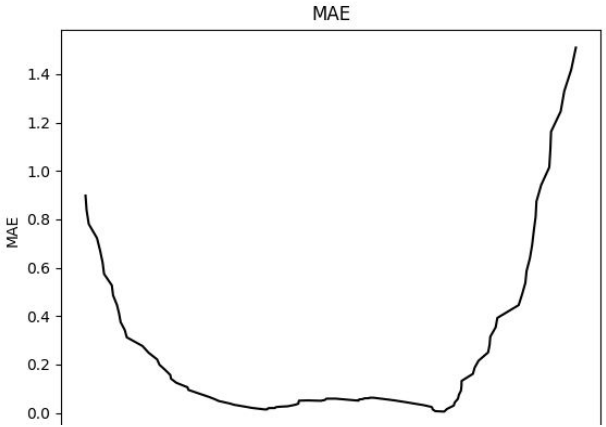


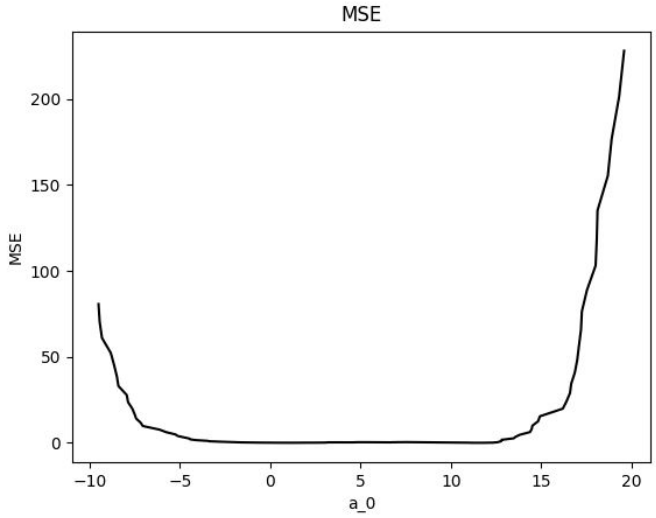
c. The output would have been the same as there was no training data or negative values to be penalized and / or changed by taking the absolute value.

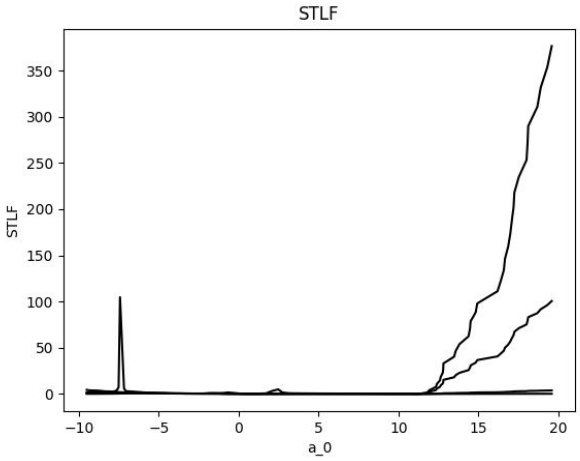
d. I broke my part A graph and ran out of time before I could fix it so I removed the red line, hopefully its enough.



e.







f.
    i. it prefers that residuals are < 0 because difference is amplified 50 times more when the residual is >= 0. So y hat should be over estimated to ensure that the residual ends up being negative.
    ii. more emphasis is put on numbers close to 5 because it results in a smaller denominator and therefor a greater calculated loss.

g. MSE minimizers are different from MAE minimizers because MSE puts greater emphasis on outliers. This makes sense because the difference between the actual y value and predicted y value is amplified when squared and therefor has a greater impact on total error in when using MSE.

h. Do not grade

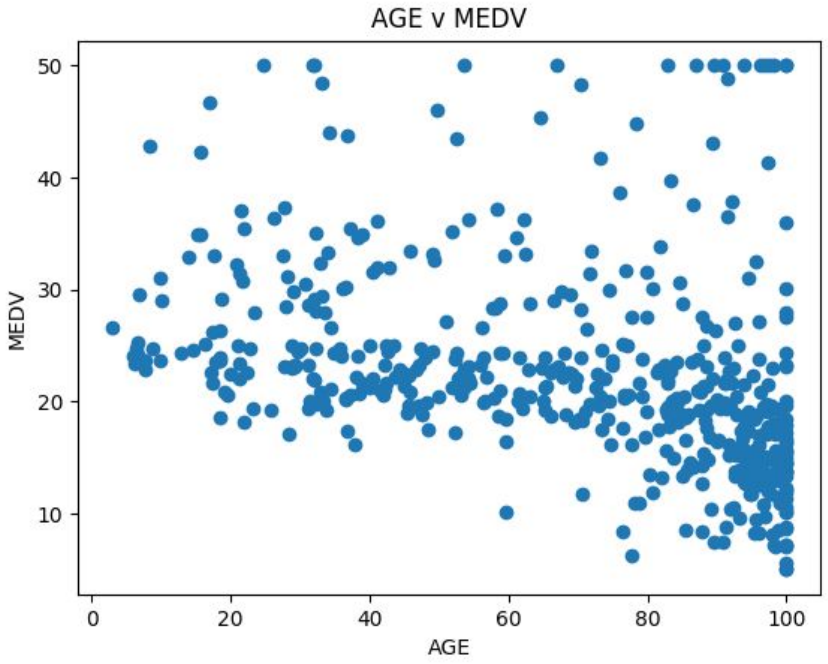
i. Do not grade

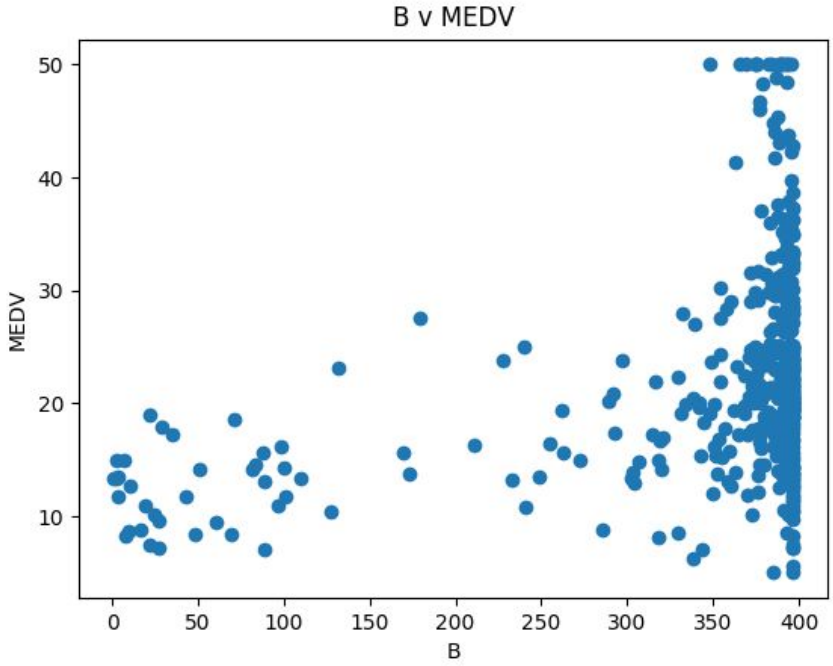
Question 2

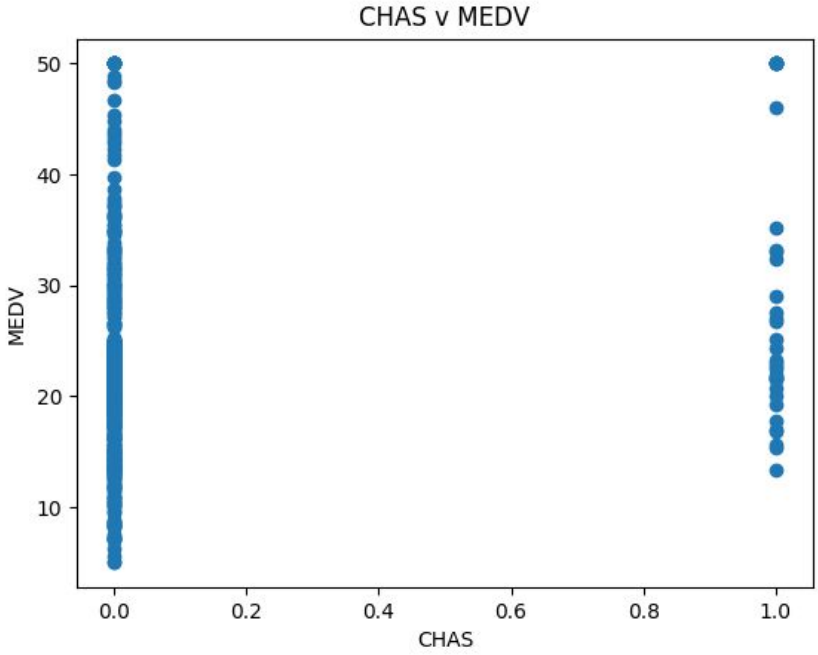
a.

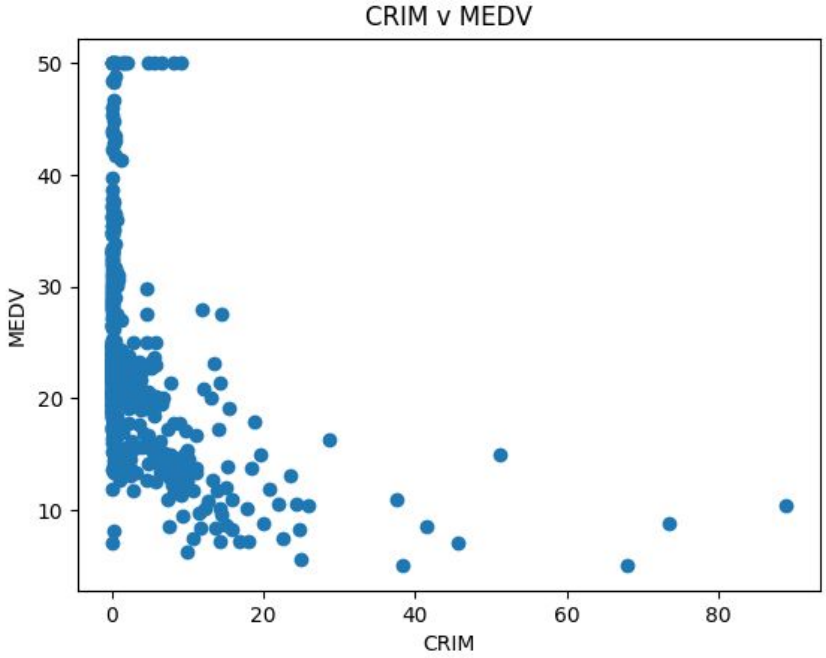
Least Relevant: CHAS is the dummy variable. ZN does not appear to have any solid correlation to MEDV. AGE offers a weak correlation between newer houses costing more but is unreliable. DIS shows that living next to employment centers could have both a positive and negative impact on MEDV.

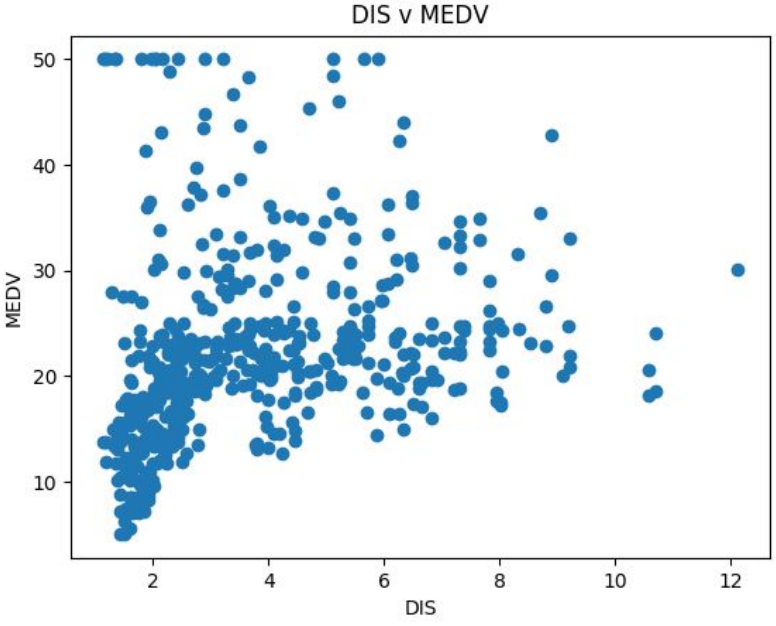
Most Relevant: CRIM shows a negative correlation between an increase in crime rates and MEDV. INDUS shows that living near city centers could indicate higher MEDV. LSTAT shows a negative correlation between an increase in LSTAT and MEDV. PTRATIO shows that areas with a lower ratio have increased MEDV as good schooling attracts wealth.

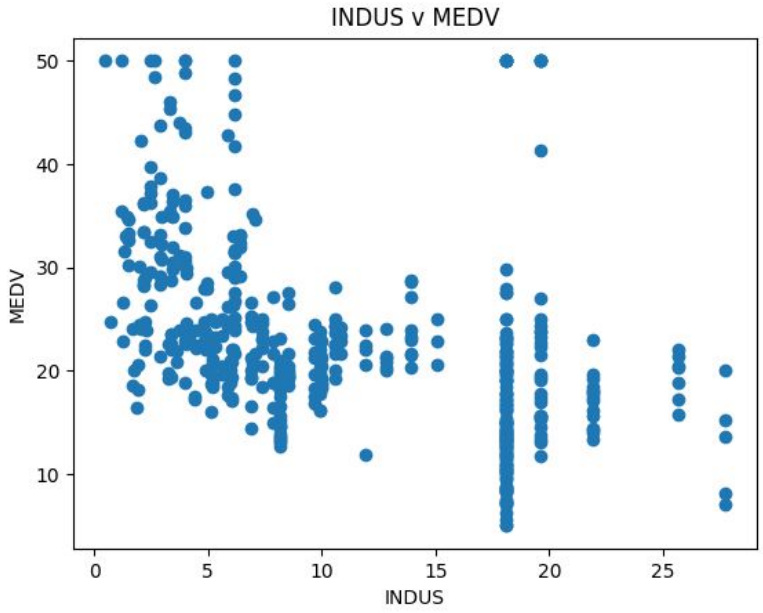


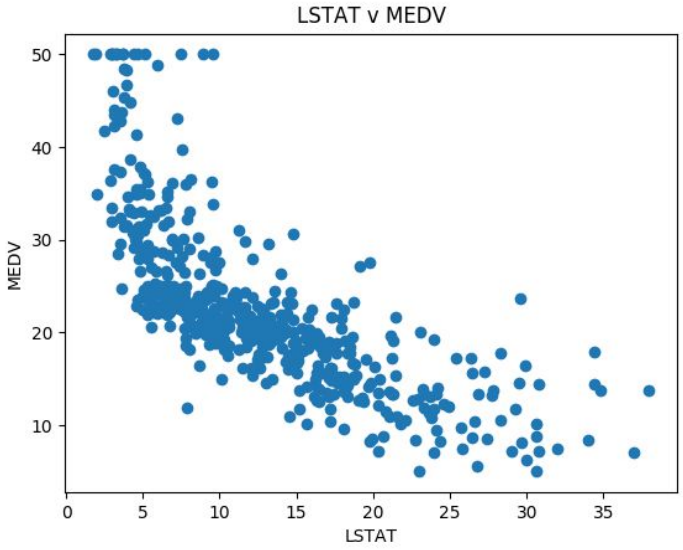

B v MEDV
MEDV
B
50
40
30
20
10
0
50
100
150
200
250
300
350
400

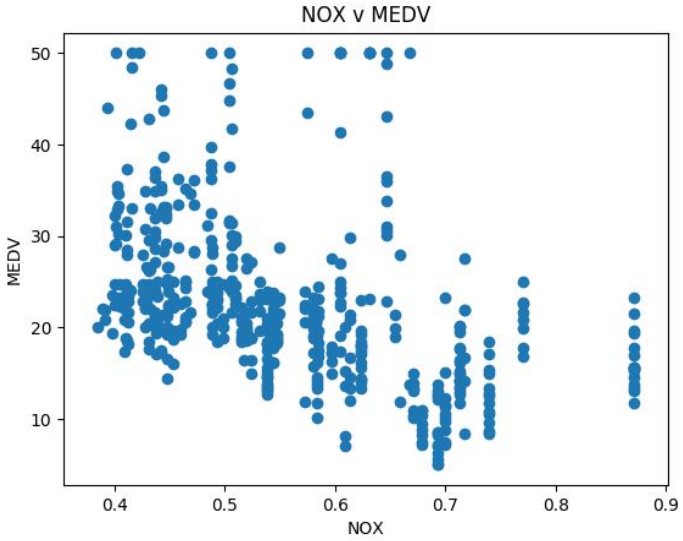

CHAS v MEDV
MEDV
CHAS
50
40
30
20
10
0.0
0.2
0.4
0.6
0.8
1.0

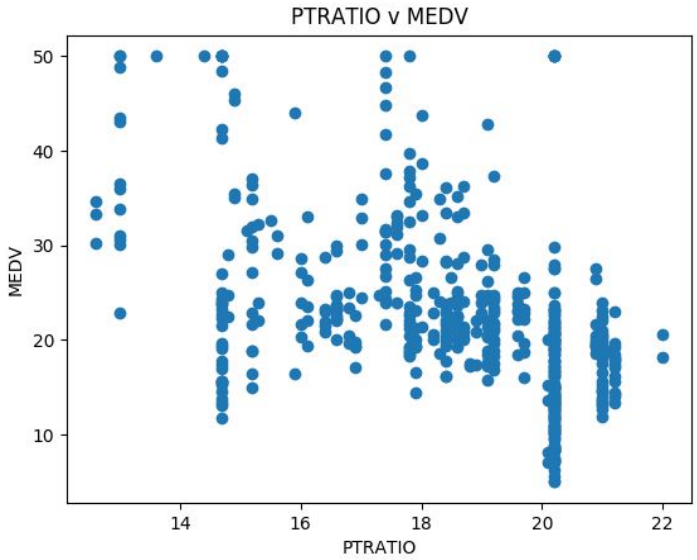

CRIM v MEDV
MEDV
CRIM
50
40
30
20
10
0
20
40
60
80

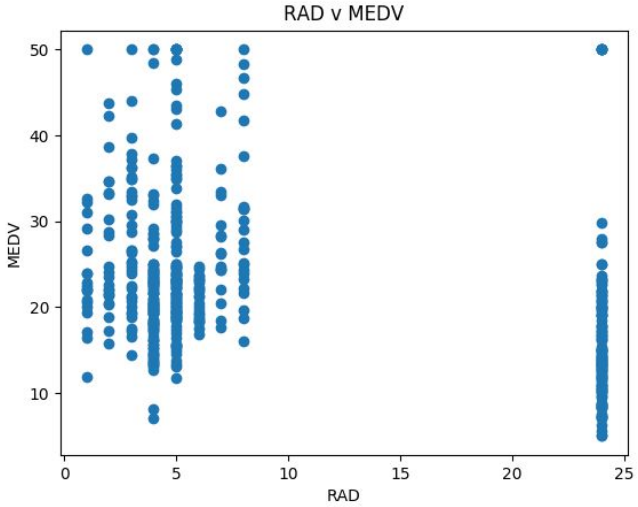

DIS v MEDV
MEDV
DIS
50
40
30
20
10
2
4
6
8
10
12

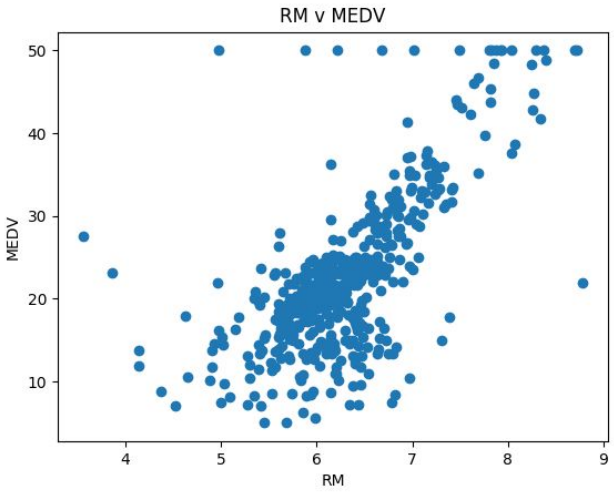

INDUS v MEDV
MEDV
INDUS
50
40
30
20
10
0
5
10
15
20
25

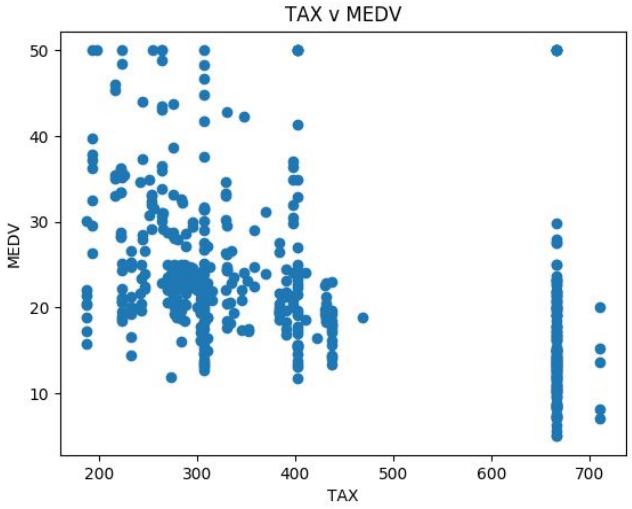

LSTAT v MEDV
MEDV
LSTAT
50
40
30
20
10
0
5
10
15
20
25
30
35

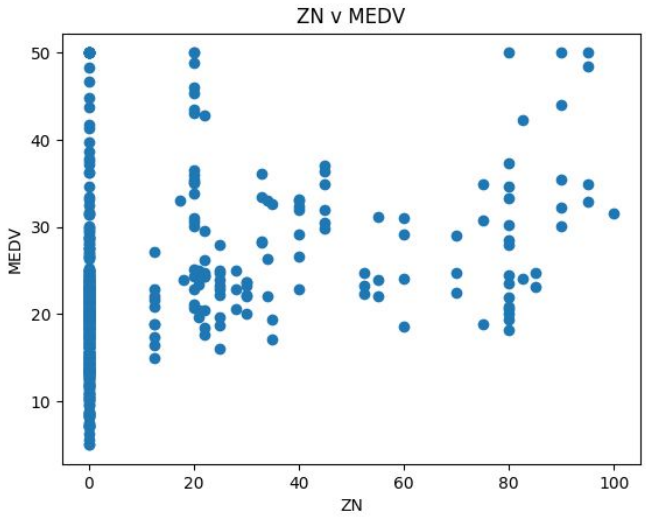

NOX v MEDV
MEDV
NOX
50
40
30
20
10
0.4
0.5
0.6
0.7
0.8
0.9


PTRATIO v MEDV
MEDV
PTRATIO
50
40
30
20
10
14
16
18
20
22


RAD v MEDV
MEDV
RAD
50
40
30
20
10
0
5
10
15
20
25


RM v MEDV
MEDV
RM
50
40
30
20
10
4
5
6
7
8
9





b. Do not grade
c. Do not grade
d. Do not grade